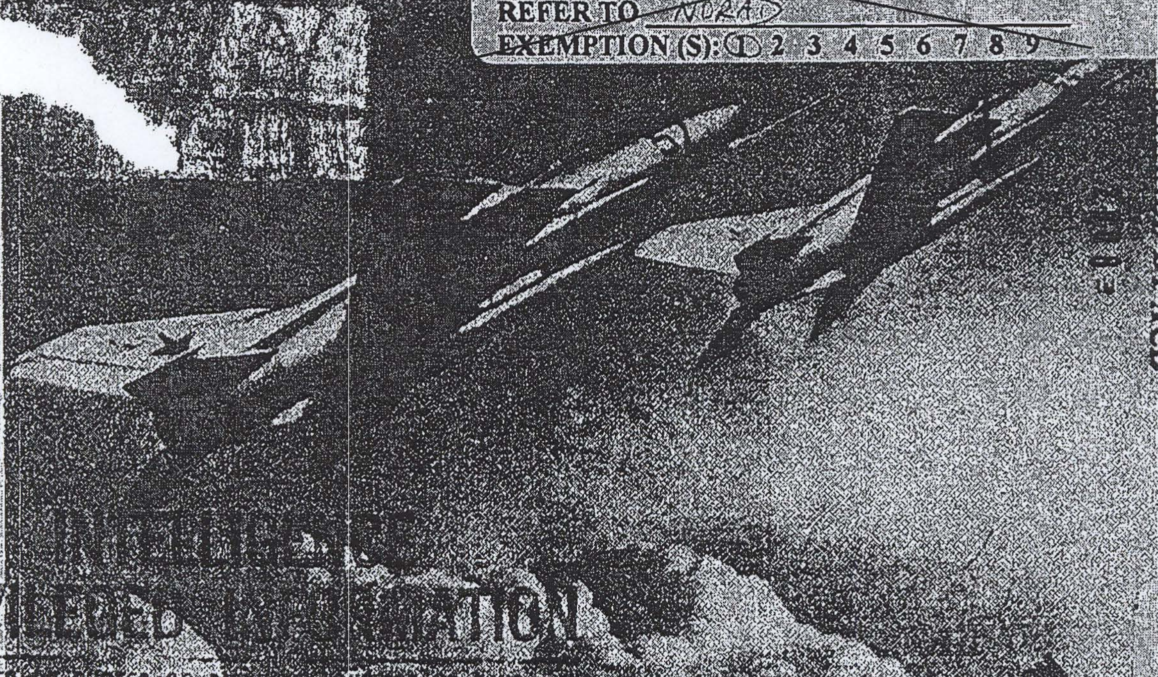
[redacted] ~~SECRET~~

~~SECRET~~

NORTH AMERICAN AIR DEFENSE COMMAND

WIR

WEEKLY INTELLIGENCE REVIEW (U)



INTELLIGENCE
PRIVILEGED INFORMATION
NOT TO BE QUOTED OR DIVULGED OUTSIDE OF RAND

FOR SPECIFIC QUESTIONS ON PROPER HANDLING IN EXTERNAL PUBLICATIONS SEE TRACY RUMFORD

36-64
4 Sept 1964

[redacted] ~~SECRET~~

~~SECRET~~

SPECIAL HANDLING REQUIRED
This document is releasable only to U.S. and Canadian Nationals

~~EXCLUDED FROM AUTOMATIC REGRADING; DOD DIRECTIVE 5200.10 DOES NOT APPLY~~ Group 1

WIR 36/64
[redacted] 1964

[redacted] SE[redacted]ET

NORAD Weekly Intelligence Review

Issue No. 36/64, 4 September 1964

The WIR in Brief

COVER: FISHBED/MIG-21 fighters (from Red Star) (OFFICIAL USE ONLY)

NOTE: Pages 30, 31, 34, 35, and 38 of this issue are blank.

[redacted] SECRET

[redacted]

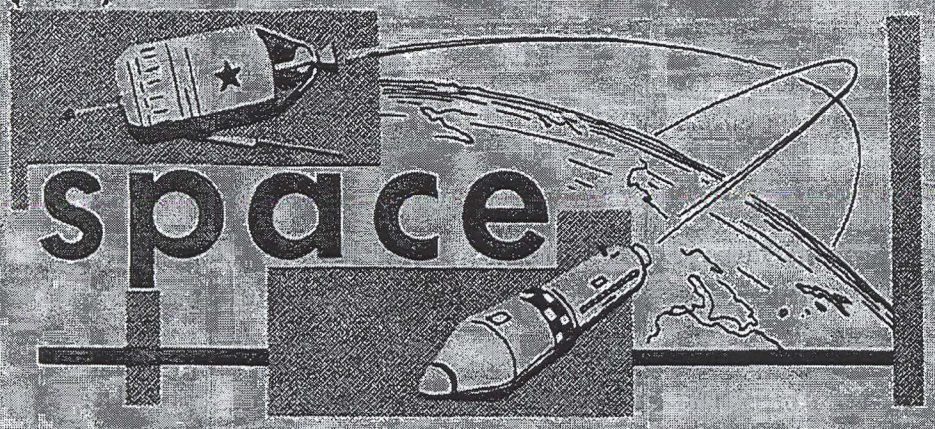
Portion identified as non-responsive to the appeal

Missile Range Firing Log Presented

US radar detected the following Soviet missile launches between 2400Z, 24 August, and 2400Z, 31 August 1964:

Date & Time	Vehicle	Launch Point	Distance
1003Z, 26 Aug	SS-4	Kapustin Yar	1050 n.m.
1600Z, 28 Aug	Cosmos 44*	Tyuratam	Orbital

*Launched by an SS-6 ICBM and Lunik 3d stage.
(Shemya & Diyarbakir RADINT)
(~~SECRET~~ NO FOREIGN DISSEMINATION Except US, UK & Canada)



significant intelligence on space developments and trends

Instrumentation Aboard Electrons 1 & 2 Listed in Soviet Journal

The May-June 1964 issue of the Soviet scientific journal "Cosmic Research" states that the following are complete lists of instrumentation aboard the Soviet satellites Electron 1 and Electron 2, which were launched 30 January:

ELECTRON 1

1. Sets of instruments, consisting of scintillation, gas-discharge, and semiconductor detectors of emanations, for studying the radiation belts of the Earth. These instruments register electrons with energies of 40 KEV (kilo-electron volts) to 10 MEV (million electron volts) and protons with energies of 2-200 MEV.

2. Apparatus for the study of soft corpuscular radiation. This consists of scintillation counters with a supplementary accelerator of electrons on one of the indicators and a magnet which cuts off electrons of low energies on the other indicator. The apparatus registers electrons of over 5 KEV and protons of over 150 KEV.

3. A beacon system intended for study of the electromagnetic characteristics of the ionosphere and of the interplanetary environment, using coherent radiowaves with frequencies of 20.005, 30.0075, and 90.0225 mc/s.

4. Ballistic piezoelectric detectors of micrometeorites with a sensitive surface of 0.03 square meters. The minimum particle mass registered is 10^{-8} (0.00000001) grams.

5. A mass spectrometer for studying the ion composition of the atmosphere at high altitudes, capable of registering mass numbers of 1-34 units of atomic mass.

6. Solar elements for the study of efficiency of solar batteries in the space environment.

ELECTRON 2

1. A set of instruments for study of the radiation belts of the Earth, the same as those on Electron 1.

2. An electrostatic spherical analyzer registering electrons and protons with energies E_o: 100, 200, 400, 1,000, 2,000, 4,000, and 10,000 electron volts in a band plus or minus 30% of E_o.

3. Two ferrosonde magnetometers measuring 3 mutually perpendicular components of the magnetic field in the band of 2-3 to 1200 gammas.

4. Roentgen counters which register X-radiation of the Sun in the intervals 2-8 and 8-18 angstroms. The counters are mounted on a platform oriented to the Sun; it "looks" at the Sun practically without interruption.

5. Apparatus for the study of the composition of cosmic rays and changes in the stream of various groups of nuclei with time. The instruments contain Cherenkov and scintillation counters which register nuclei with charges of Z equal to or greater than 2, equal to or greater than 5, and equal to or greater than 15, and heavier ones with energies exceeding 600 million electron volts per nucleon.

6. Apparatus for registering cosmic radiowaves at frequencies of 725 and 1525 mc/s.

7. A charged particle trap, analogous to those used on all the space rockets (Ed. Note: apparently referring to vertically fired rockets). The trap registers the positive masses of the Earth's plasma cloud and protons of the Sun's corpuscular streams. Electrons with energies of more than 100 electron volts are also registered by the trap, but they create collector currents of opposite sign.

8. A mass spectrometer for study of the ion composition of the atmosphere at high altitudes. This apparatus has parameters the same as those of the apparatus installed on Electron 1.

9. Solar elements for study of their efficiency in the space environment.

A general outline of the missions of Electrons 1 and 2, taken from Pravda, was published in WIR 14/64. This outline described the instrumentation in less detail than the foregoing and carried drawings of the "Electrons," which were also published in WIR 14/64. Slightly better drawings were printed in "Cosmic Research," and these are reproduced on pages 36 and 37.

Electrons 3 and 4, which were launched 10 July 1964, probably carry similar instrumentation, judging by a brief article in Izvestia which described its missions.

(Soviet press -- a NORAD translation)
(OFFICIAL USE ONLY)

Cosmos 44 Possibly a Meteorological Satellite

The Soviet satellite Cosmos 44 which was launched from Tyuratam at 1600Z, 28 August, may have been assigned a mission of meteorological

reconnaissance. It has few similarities to other Cosmos-series vehicles launched from Tyuratam.

Orbital parameters have been furnished as follows:

	By SPADATS	By TASS
Inclination to Equator	65.02 degrees	65 degrees
Period	99.5 minutes	99.5 minutes
Apogee	860.1 kilometers (464.4 n.m.)	860 kilometers (463 n.m.)
Perigee	612.0 kilometers (330.5 n.m.)	618 kilometers (332 n.m.)

50X1 and 3, E.O.13526

Subsequent to injection of the payload into orbit, [redacted] These signals appear to be switching in mode, from 8 channels to 256 channels; they might be video signals.

Analysis of RADINT signature data does not yet yield dimensions but does indicate that the payload is spin-stabilized and has 4 protrusions. Two of the protrusions are probably antennas mounted at an angle of 180 degrees to each other; the other 2 are probably "paddles" of solar cells (for generating electricity for on-board systems, including communications), also mounted at an angle of 180 degrees to each other.

Cosmos 44 has the same Equatorial inclination (a nominal 65 degrees) as most of the TT-launched Cosmoses, and it was launched by the same type of propulsion system. In almost all other respects, however, there are differences, and these point to a meteorological reconnaissance mission for Cosmos 44, rather than the photoreconnaissance mission of the average TT Cosmos.

- Cosmos 44's apogee and perigee are about twice those of the usual TT Cosmos. They are relatively close to the 400 n.m. altitude considered optimum for meteorological reconnaissance (cloud-cover photography). The low apogee and perigee of preceding TT Cosmoses were better suited for photoreconnaissance in that they afforded a closer "look" at ground targets and were low enough for de-orbit of the vehicle and recovery of the film. The higher orbit of Cosmos 44 affords the wider angular coverage needed for cloud-cover photography.

50X1 and 3, E.O.13526

- Most TT Cosmoses were launched between the hours of 0830Z and 1030Z, so that they would be at perigee during daylight over Free World photoreconnaissance targets (such as the US and southern Canada). Cosmos 44 was launched 5.5 to 7.5 hours later.
- Most TT Cosmoses were Earth-oriented. Cosmos 44 is spin-stabilized.
- The on-board systems of Cosmos 44 appear to be powered by solar cells, which would be used on a mission of long or indefinite duration, such as meteorological reconnaissance. Systems of most of the TT Cosmoses which were de-orbited, appeared to be powered by chemical batteries.
- [redacted]

50X1 and 3, E.O.13526

- The Soviets have committed themselves to establishment of a cooperative US-USSR system of weather satellites. The appearance of at least a prototype Soviet weather satellite has been estimated for late 1964. A video system which would be suitable for transmission of cloud-cover photography apparently was tested and proven on Cosmoses #4, 7, 9, and 15.

Cosmos 44 is not likely to be de-orbited. De-orbit from such high altitudes would be difficult and, if the vehicle is a meteorological satellite, unnecessary. (SPADATS; various ELINT monitors)
(~~SECRET~~ NO FOREIGN DISSEMINATION Except US, UK & Canada)

Mission of Cosmos 41 Still in Doubt

The mission of Cosmos 41, which was launched from Tyuratam on 22 August is still in doubt. This vehicle was originally injected into a parking orbit and then, prior to the end of the Zero Orbit, injected into an exceptionally eccentric orbit of high apogee (21,500 n.m.). No signals from this vehicle have been intercepted since its injection into the higher orbit. Thus, if it was intended to collect data on the space environment, as announced by the Soviets, it should be deemed a failure.

Certain circumstances do point to a data-collection mission:

- The vehicle, which has an orbital period very close to 12 hours, would pass through essentially the same four areas of the Van Allen belts once each day.
- Perigees of the vehicle alternately occur over the launch site and in the vicinity of the Soviet missile-range instrumentation ships now stationed in the Pacific.

The vehicle could also have a mission -- primary or secondary -- of testing the reliability of the 4th stage which previously had been used by the Soviets only for injecting lunar or interplanetary probes into transfer trajectories. Such a test would be desirable, in view of the probe's 8 ignition failures in 12 known attempted starts.

The high apogee might also suggest that the vehicle was intended to be a synchronous-orbit satellite, that is, one with an orbital period of 24 hours, similar to the US's Syncoms. This seems unlikely, however, since the Soviets probably would have chosen for this purpose an orbit with a much lower Equatorial inclination than the one used -- a nominal 64 degrees.
(NORAD)
(~~SECRET~~ NO FOREIGN DISSEMINATION Except US, UK & Canada)

Recent Multiple Launches May Be Preparatory to Rendezvous Attempt

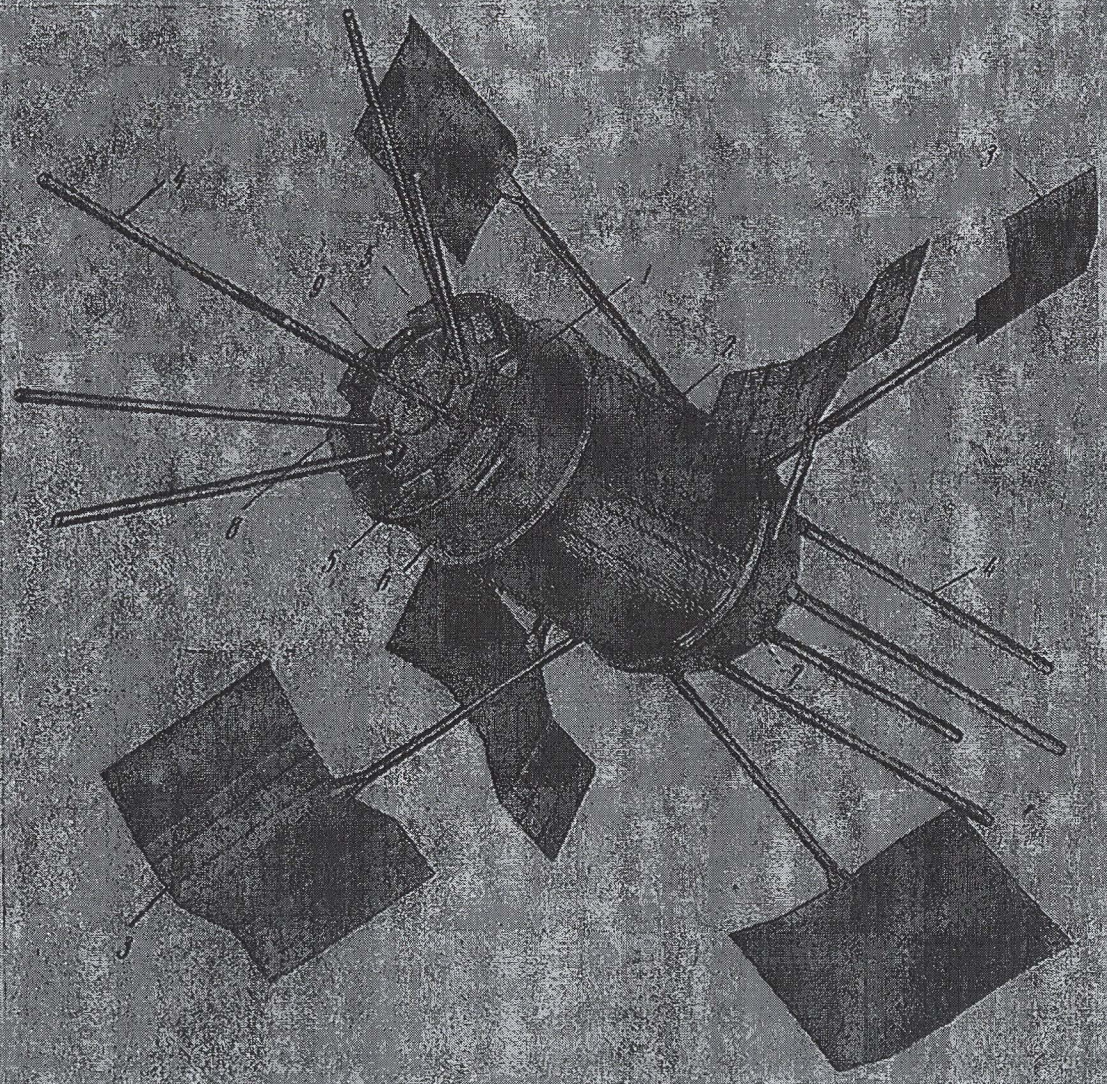
Two recent Soviet launches of multiple payloads may have been intended to test the capabilities of the Soviet space-tracking system to track simultaneously multiple satellites in nearly similar orbits. Such a test would be a desirable preliminary to rendezvous attempts -- manned or unmanned. None of the vehicles involved (Cosmoses 38, 39, and 40, which launched from Tyuratam on 18 August; and Cosmoses 42 and 43, which were launched from Kapustin Yar on 22 August) are transmitting signals other than HF beacon signals. The Soviet space-tracking system is known to rely heavily on beacon tracking.

The Soviets have previously taken two important steps toward development of a rendezvous capability:

- Precision launches of a space vehicle into an orbit similar to that of a previously launched vehicle (Vostok 4, which passed within 5 kilometers of Vostok 3)
- Test of maneuverability of a payload (Polet 2), though the magnitude of the maneuvers were relatively small.

The test of the Soviet space-tracking system could be in addition to other missions, such as collection of data on electron density in the ionosphere (for Cosmoses 38, 39, and 40 -- see WIR 34/64) and test of the Kapustin Yar launch vehicle to launch 2 payloads simultaneously (for Cosmoses 42 and 43 -- see last week's WIR).

Another possibility is that these multiple launches are concerned with development of an economical, low-orbit, multiple-satellite communications relay system.
(NORAD; FTD)
(~~SECRET~~ NO FOREIGN DISSEMINATION Except US, UK & Canada)



Electron 1 Satellite (from the Soviet press)

1. Sealed body of the satellite.
2. Shutter system of heat regulation.
3. Solar batteries.
4. Antennas.
5. Micrometeorite detector.
6. Instrument for registering corpuscular radiation.
7. Mass spectrometer.
8. Proton detector.
9. Instrument for study of the energy spectrum of electrons of the radiation belts.

NORAD

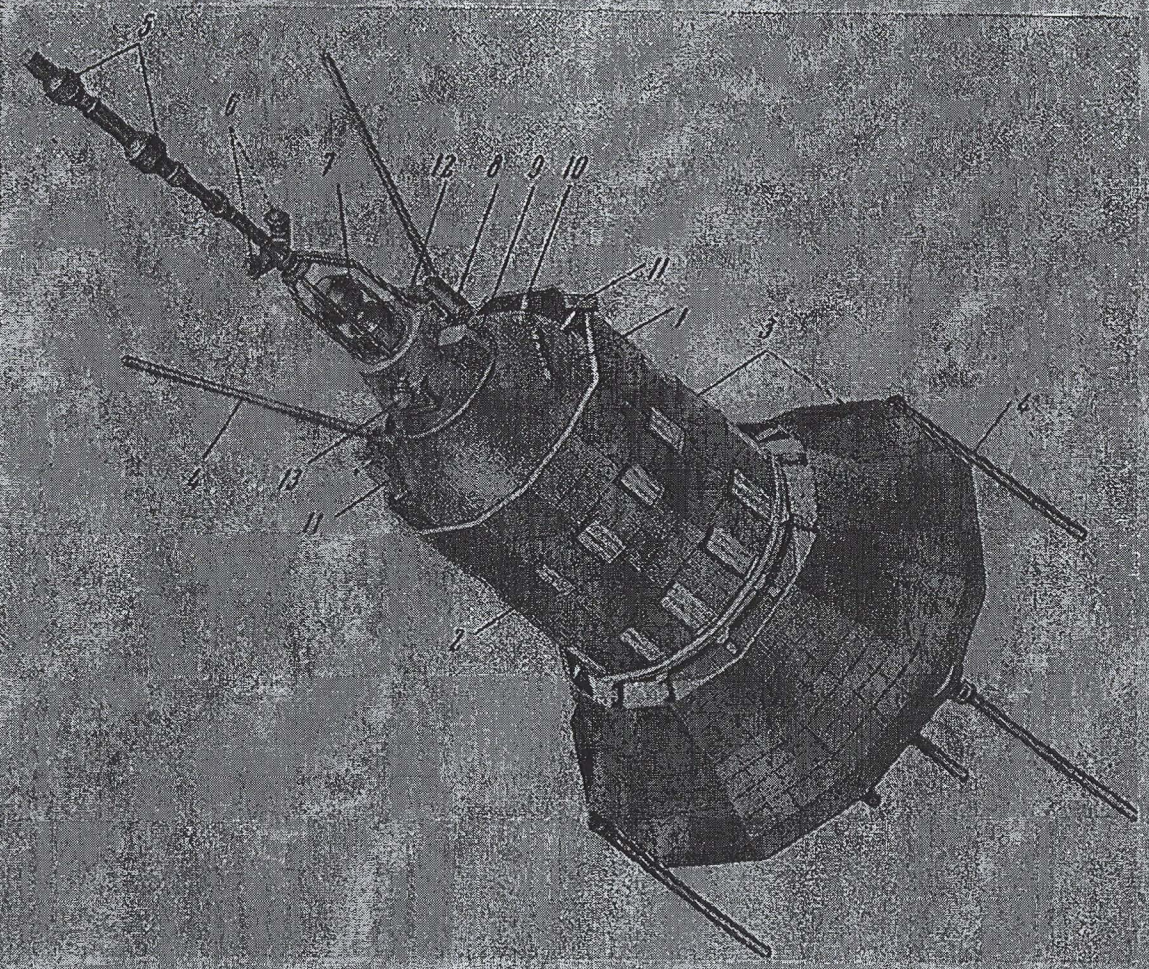
WIR 36/64

OFFICIAL USE ONLY

SECRET

Electron 2 Satellite)
(from the Soviet press)

1. Sealed body of the satellite.
2. Shutter system of heat regulation.
3. Solar batteries.
4. Antennas.
5. Magnetometer.
6. Sensors of solar orientation.
7. Spherical analyzer for study of the energy spectrum of particles of low energy.
8. Instrument for study of the chemical composition of cosmic rays.
9. Instrument for studying the energy spectrum of electrons of the radiation belts.
10. Mass spectrometer.
11. Instrument for study of the Sun's X-radiation.
12. Detector of low-energy protons.
13. Charged-particle trap.



NORAD

WIR 36/64

OFFICIAL USE ONLY

SECRET